

VI. ABSTRACT:

A droplet forming flow cytometer system allows high speed processing without the need for high oscillator drive powers through the inclusion of an oscillator or piezoelectric crystal within the nozzle volume and directly coupled to the sheath fluid.

The nozzle container continuously converges so as to amplify unidirectional oscillations which are transmitted as pressure waves through the nozzle volume to the nozzle exit so as to form droplets from the fluid jet. The oscillator is directionally isolated so as to avoid moving the entire nozzle container so as to create only pressure waves within the sheath fluid. A variation in substance concentration is achieved through a movable substance introduction port which is positioned within a convergence zone to vary the relative concentration of substance to sheath fluid while still maintaining optimal laminar flow conditions. This variation may be automatically controlled through a sensor and controller configuration. A replaceable tip design is also provided whereby the ceramic nozzle tip is positioned within an edge insert in the nozzle body so as to smoothly transition from nozzle body to nozzle tip. The nozzle tip is sealed against its outer surface to the nozzle body so it may be removable for cleaning or replacement.

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